

PORTLAND FIRE WEATHER – 2005 ANNUAL REPORT

RED FLAG WARNING STATISTICS FOR 2005

Table three shows the Red Flag verification statistics for the 2005 fire season.

TABLE THREE (ALL WARNINGS)

ZONE	# RFW	CORRECT RFW (A)	INCORRECT RFW (B)	MISSED EVENTS (C)	POD A/(A+C)	CSI A/(A+B+C)	FAR (1- [A/(A+B)])
601	0	0	0	0	0	0	0
612	0	0	0	0	0	0	0
602	0	0	0	0	0	0	0
603	0	0	0	0	0	0	0
604	0	0	0	0	0	0	0
605	2	1	1	1	0.50	0.33	0.50
606	1	0	1	0	0	0	1.00
607	3	2	1	1	0.67	0.50	0.33
608	2	1	1	0	1.00	0.50	0.50
660	1	1	0	1	0.50	0.50	0
TOTALS (ALL)	9	5	4	3	0.63	0.42	0.44
LIGHTNING	0	0	0	0	0	0	0
WIND/RH	7	3	4	3	0.50	0.30	0.57

NUMBER OF WARNED EVENTS: 3
EVENTS PRECEDED BY A WATCH: 1 OR 33%
MISSED EVENTS: 1

NOTE: Refer to the Annual Operating Plan for complete Red Flag criteria.

EVENT LEAD TIMES

The following tables (four and five) show the respective warning and watch lead times for all events in 2005.

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TABLE FOUR – WARNING LEAD TIMES

<i>EVENT</i>	<i>RANGE OF LEAD TIMES</i>	<i>AVE. ZONE LEAD TIME</i>
<i>July 27 (Dry and Unstable Air Mass)</i>	3 hrs 52 min ZONES 607 and 608	3 HR 52 MINS
<i>August 12-13 (Low RH and east wind)</i>	DID NOT VERIFY	DID NOT VERIFY
<i>August 25 (Low RH and east wind)</i>	0 hrs ZONE 660 1 hr ZONES 605 and 607	0 HRS 40 MINS

TABLE FIVE – WATCH LEAD TIMES

<i>EVENT</i>	<i>RANGE OF LEAD TIMES</i>	<i>AVE. ZONE LEAD TIME</i>
<i>July 27 (Dry and Unstable Air Mass)</i>	NO WATCH ISSUED	NO WATCH ISSUED
<i>August 12-13 (Low RH and east wind)</i>	WARNING DID NOT VERIFY	WARNING DID NOT VERIFY
<i>August 25 (Low RH and east wind)</i>	NO WATCH ISSUED	NO WATCH ISSUED

A few notes on verification and the 2005 events: The overall severity of any fire season is highly correlated with the extent and frequency of critical fire weather patterns during the season. It is not unusual to have an extended dry period during any given fire season. This, in itself, could result in an elevated degree of fire activity, provided the fuel conditions are right. However, to elevate a high fire danger situation to a critical level normally requires an additional weather element, or trigger, to be superimposed on the dryness factor. This additional trigger could be thunderstorms with no appreciable precipitation, an extremely unstable air mass (Haines 6), or a combination of strong wind and low humidity. Red Flag warnings are issued when a combination of critical weather elements exist *in combination with* sufficiently dry fuels and severe burning conditions.

Determining lead-time for problematic lightning is highly subjective. The Portland office has made a major effort to get away from the term “dry lightning”. In 2004, new lightning criteria were introduced to the users. However, the use of the term “episode lightning” was misunderstood. Therefore, in 2005, the phrase “lightning with no appreciable precipitation” was introduced. The general premise was to avoid the subjectivity of determining whether lightning accompanied rain or not. If the fuel conditions were expected to remain high, or critical, during and after the lightning event, then a Fire Weather Watch or Red Flag warning was warranted. The Northwest Coordination Center developed a scheme to monitor fuel conditions. The two correlating factors were determined to be Energy Release Component (ERC) and 100-hour fuel moistures. It was found that there were distinct breakpoints of ERC and 100-hour fuel

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moistures that corresponded to minimal or no large fire potential, an average risk of large fire potential, and a higher than average risk of large fire potential.

It is a given that fires **will** occur during or after a lightning episode following an extended dry spell. However, does that fact alone warrant a Red Flag warning? If all the resultant fires remain small and/or initial attack can handle them, was the event critical? Should one or more fires get large, then it is reasonable to assume the event was critical and a warning justified.

The 2005 Red Flag criteria were generally unchanged from 2004. It was determined that the 2003 criteria were confusing, especially wind and low RH parameters. Nearly every zone had its own wind and humidity criteria. It was decided to simplify these criteria by creating distinct areas. The Portland fire weather region was divided into five regions, and Red Flag wind and humidity values assigned to each region. It was also assumed that if one zone within a region hit criteria, then by default, the remaining zones within the region achieved criteria. It is hard to imagine a synoptic-scale east wind event, typical of late spring or late summer, that verifies in the North Oregon Cascade foothills, but **does not** verify in the adjacent North Oregon Cascades or South Washington Cascades. The main problem continues to be with the RAWS stations. The land agencies have gotten better at RAWS maintenance during the past couple of years, but a lot more work needs to be accomplished. Some RAWS sites that were good wind stations in the past, have suffered due to overstory growth, understory expansion and other environmental factors.

Another problem arises when verifying warnings by zone. Multiple zones may be included in a warning, but some areas may not have useful verifying observing stations. Some zones may end up not meeting warning criteria simply because there are no verification stations with good data. This, in turn, will result in lower Probability of Detection (POD) scores, and higher False Alarm Rates (FAR). Moving RAWS stations may actually hinder verification. There has been a push in the past couple of years for units or districts to conduct seasonal surveys on their RAWS stations and take appropriate action to clear brush, remove trees, etc in order to conform to RAWS site standards.

The highest low temperature in zones 605, 607, and 660 was 71 degrees at Horse Creek on July 27th. The highest low temperature for zones 606 and 608 was 72 degrees at Yellowstone on July 27th.

Tillamook RAWS, zone 601, had four days when the high temperature was above 80 degrees. The first occurrence was May 25th with a high of 86. The high on the next day was 91 degrees, which was the warmest day of the season. The other two instances occurred on July 17th and August 25th.

On September 10th, Emigrant RAWS, zone 608, recorded a high temperature of just 48 degrees. Trout Lake RAWS, zone 660, had a high of just 47 degrees on the 9th.

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NFDRS VERIFICATION STATISTICS FOR 2005

National Fire Danger Rating System (NFDRS) forecasts remain a high priority at the Portland office. Users depend on these forecasts for a variety of reasons, such as determining whether to limit or curtail forest activities, updating pocketcards, and determining staffing levels. A Memorandum of Understanding (MOU) between the Pacific Northwest Coordinating Group (PNWCG) and National Weather Service included specific forecast performance measures for NFDRS forecasts. These verification standards were based on performance against persistence. The base performance measures were 35 percent improvement over persistence for temperature, 25 percent improvement for humidity, and 10 percent for wind. However, the MOU also called for a goal of 30 percent improvement each year. Thus, the 2005 performance goals were actually 45 percent improvement over persistence for temperature, 33 percent improvement for humidity and 13 percent for wind. At the latest PNWCG meeting, in November 2005, it was determined that the above performance measures were unrealistic. A new MOU, which will take effect in 2006, will have new NFDRS performance standards.

The following table (Table Six) shows the 2005 NFDRS verification statistics, by area, and by zone.

TABLE SIX – 2005 NFDRS VERIFICATION

ZONE	TEMPERATURE	HUMIDITY	WIND
ALL	31.5%	24.9%	-4.3%
601	29.1%	20.7%	-7.9%
602	27.7%	22.9%	-2.4%
603	25.3%	19.2%	6.8%
605	39.4%	22.6%	-2.9%
606	30.0%	26.0%	-7.2%
607	36.6%	30.8%	-13.9%
608	35.5%	28.9%	-2.7%
612	7.4%	2.4%	-8.6%
660	37.4%	30.5%	-4.1%

A more meaningful verification statistic is the mean absolute error (MAE). The total number of forecasts can skew the improvement percentages. There could be a higher

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MAE with a smaller forecast sample. This could still give a high improvement score. For instance, there were 128 forecasts in May. The temperature MAE was 5.74 degrees, the persistence MAE was 7.72 degrees, which yielded an improvement over persistence of 25.6 percent. The 25.6 percent may seem good, but an MAE of 5.74 degrees is not. In October, there were 201 forecasts. The forecaster MAE was 4.87 degrees, the persistence MAE 6.74 degrees, for an improvement of 27.7 percent. Despite a lower MAE, the improvement over persistence in October was similar to that of May.

The Portland office also provided individual NFDRS forecasts for three sites: 1) Village Creek, 2) Pebble, and 3) Fields. Table Seven shows the performance scores for the three RAWs sites.

TABLE SEVEN – 2005 SITE-SPECIFIC NFDRS VERIFICATION

SITE	TEMPERATURE			HUMIDITY			WIND		
	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE
<i>Village Creek</i>	<i>3.82</i>	<i>5.78</i>	<i>33.91%</i>	<i>8.60</i>	<i>12.02</i>	<i>28.45%</i>	<i>1.31</i>	<i>1.49</i>	<i>12.08%</i>
<i>Pebble</i>	<i>5.00</i>	<i>6.48</i>	<i>22.84%</i>	<i>10.73</i>	<i>14.87</i>	<i>27.84%</i>	<i>1.37</i>	<i>1.41</i>	<i>2.84%</i>
<i>Fields</i>	<i>3.87</i>	<i>5.98</i>	<i>35.28%</i>	<i>9.48</i>	<i>13.05</i>	<i>27.36%</i>	<i>1.92</i>	<i>2.03</i>	<i>5.42%</i>

Wind is a difficult element to forecast due to the limited variability. Village Creek, Pebble, and Fields typically do not show much wind. This is especially true for Village Creek where the median afternoon 10-minute wind speed is just 3 mph. The 90th percentile wind speed is 5 mph. Thus, it is very difficult to beat persistence at Village Creek. Pebble and Fields have more wind variability, with median afternoon wind speeds of 7 mph. Site-specific forecasts will be provided for at least two or three more stations in 2006.

The 97th percentile ERC value for zones 605, 607, and 660 is 47. This value was exceeded on a few days during the last three weeks of August. The highest 10-day average was 45.6, from August 21st through 31st. This represents a 96th percentile ERC value.

The 97th percentile ERC value for zones 606 and 608 is 50. Despite a rather wet May, June and early July, average ERC values reached 51 in early August, and peaked at 56 by August 20th. Record ERC values were noted at many RAWs. The third percentile 100-hour fuel moisture for this area is 9.4. In other words, the 100-hour fuel moisture exceeds 9.4 on 97 percent of all days. In 2005, the lowest 10-day average was 7.9 August 1st through 10th.

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STATISTICS FOR AREA ONE (COASTAL STRIP ZONES)

This area is comprised of zones 601 and 612. RAWs used to represent the area include:

Cedar Creek, Cannibal Mountain, Goodwin Peak, Huckleberry, Dunes, and Tillamook.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			3 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	58.3	46.3	75.8	0	97.5	0	0.4	23.0	9	4	3	1
11-20	58.1	46.6	74.2	0	97.1	0	0.0	27.4	8	5	5	4
21-31	64.6	48.0	56.7	2	85.2	3	3.3	18.5	3	3	2	2
June 1-10	57.3	43.9	72.7	0	97.2	0	0.1	24.2	7	6	3	2
11-20	62.9	47.5	59.2	0	94.1	1	0.7	18.7	6	4	2	3
21-30	63.4	50.4	73.3	0	97.1	0	1.7	19.7	4	1	1	1
July 1-10	64.2	48.9	70.7	0	96.2	0	3.7	18.6	6	2	2	0
11-20	72.5	52.8	57.0	0	88.6	3	5.5	18.2	2	1	0	0
21-31	73.6	53.6	51.6	0	79.6	5	20.3	11.3	1	0	0	2
Aug 1-10	72.5	54.1	52.1	0	79.4	5	32.0	10.1	0	0	0	0
11-20	71.6	53.4	58.7	0	87.8	3	33.5	12.7	1	0	0	0
21-31	70.5	51.3	54.6	0	89.5	3	33.7	13.7	2	0	0	0
Sept 1-10	67.5	48.9	58.4	0	90.7	0	31.8	14.3	2	1	1	1
11-20	65.0	46.9	58.8	0	95.5	0	26.2	17.1	1	1	0	0
21-30	64.8	46.1	53.1	0	83.9	4	31.0	13.9	2	2	1	0
Oct 1-10	57.6	46.0	76.3	0	98.6	0	4.8	24.8	8	4	2	2
11-20	59.1	47.6	76.7	0	98.0	0	4.8	21.6	3	2	2	0
AVE/TOT.	64.9	49.0	63.5	2	91.5	27	13.7	18.1	65	36	24	18
2004	66.2	51.0	64.5	2	92.2	13	9.6	18.3	55	36	29	13
2003	66.5	49.9	58.9	5	88.6	22	31.4	13.8	32	19	14	14
2002	65.5	49.4	63.6	5	92.0	23	20.3	15.9	37	20	10	3
2001	66.0	47.8	59.3	7	89.8	12	NA	NA	46	30	15	4
2000	69	51	57	11	89	16	NA	NA	32	15	8	5
1999	68	50	60	10	89	19	NA	NA	43	14	4	3
1998	72	53	58	2	87	12	NA	NA	25	11	6	4
1997	70	53	60	1	90	10	NA	NA	43	30	24	10

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<u>DRY SPELL</u>							
2005	2004	2003	2002	2001	2000	1999	1998
60 DAYS	53 DAYS	105 DAYS	35 DAYS	22 DAYS	44 DAYS	33 DAYS	47 DAYS

AREA HIGHLIGHTS

OVERVIEW: The 2005 season in the Coastal Strip zones was defined by three distinct periods. May through early July was wet and cool, with several lightning events. Mid-July through mid-September was the dry portion of the season. Finally, another wet and cool period occurred from late September through October. The most interesting aspect of the 2005 season can be observed in the fuel indices. Average ERC values remained in single digits through July 20th, and then made a big jump in late July and early August. During the 2004 season, ERC values started at 8.8 and remained above 10 through September 10th. The “dry spell” of the 2005 season, with median precipitation of less than one-tenth of an inch, was 60 days. This was slightly longer than the 53 days in 2004, but much shorter than the 105 days in 2003. There were 10 more days this season when the median precipitation was greater than 0.01 inch but less than 0.10 inch. The number of days with median precipitation of 0.25 inches or more was slightly less this year than the 2005 season.

Lightning frequency was higher during the 2005 fire season as compared to 2004. In fact, the total of 18 lightning days was the highest since 1997. Nearly all of the lightning occurred in May and June, during cool closed-upper low episodes.

TEMPERATURE: The seasonal average of 64.9 degrees was the coolest since 1994. The warmest 10-day period occurred at the end of July, with an average of 73.6 degrees. Surprisingly, only two stations recorded a high temperature of 90 degrees or more during the entire 2005 fire season. Tillamook hit 91 degrees on May 26th, Cannibal recorded 92 on July 17th and 93 on July 26th.

HUMIDITY: Critical daytime humidity during the 2005 season was defined as: at least three stations reporting 25 percent or less humidity, for at least two hours on any given day. There were only two critical daytime humidity days during the season, similar to 2004. Critical humidity nights for the 2005 season were defined as greater than half of the stations reporting relative humidity less than or equal to 60 percent for at least two hours during any given overnight period. There were far more critical humidity nights in the 2005 season as compared to 2004 (27 vs. 13). In fact, the 2005 total of 27 was the highest since 1996. The majority of the critical humidity nights occurred from late July through mid-August, which was the core of the fire season when nighttime subsidence inversions were quite prevalent. Most stations observed maximum humidity values of 40 to 60 percent during the period July 21 through July 31. The 10-night average was near 80 percent from July 21-31 and August 1-10.

PRECIPITATION: The 2005 season was quite wet in May and June, and again in late September through October. There were 24 days when the median precipitation was at least 0.25 inches. Eighteen of these days occurred from May 1 to July 10. During the 2004 fire season, a significant late-August rain event brought an abrupt end to the fire season. This year, a major rain event occurred on September 30th. However, there were two earlier September days when

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the median precipitation was at least one-tenth of an inch, and one day in early September when the median was one-quarter of an inch or more. Rainfall on September 30th included 2.95 inches at Cedar Creek, 1.98 inches at Tillamook, and 1.39 inches at Goodwin Peak.

FUELS: The 2005 season-average ERC of 13.7 was slightly higher as compared to 9.6 in 2004. The peak values of 30-35 occurred in August through early September. The maximum 10-day average was 33.7, occurring over the period August 21-31. Critical values of 40 or more were not realized for any 10-day period. During 2005, the peak was 40.5 in mid-August. Average 2005 season ERC values remained near or below 5 through July 20, and then jumped to 32 by August 10th. The late-August rain event in 2004 caused average ERC values to fall from 40.5 to 16.2. ERC values this season held in the 30s through September 10th, dipped slightly below 30 in mid-September, then rose to 31 in late September. The September 30th rain event brought the average ERC down to 4.8 by October 10th.

The 100-hour fuel moisture values were at or above 15 percent for much of the 2005 fire season. Critical values of 12 percent occurred from July 21 through August 10. The minimum was 10.1 percent for the 10-day period of August 1-10. In 2005, the lowest 10-day average was 11.5 percent.

INTERESTING TIDBITS: The first significantly warm day of the season was May 26th. On this day Tillamook had a high of 91 degrees, both Goodwin and Cedar Creek reached 87 degrees, Cannibal peaked at 86 degrees and Huckleberry recorded 84. Most of the inland stations recorded daytime humidity values on May 26th of 15 to 20 percent. Cedar Creek registered 17 percent, and Tillamook had 18 percent.

The lowest nighttime humidity value was 21 percent at Cedar Creek RAWs on August 9th. On May 26th humidity recovery was 25-35 percent at Cedar Creek, Tillamook, and Cannibal.

Although the 10-day ERC average did not exceed the critical level of 40 at any time during the season, individual stations managed to do so. The highest recorded ERC value was 49 at Cedar Creek on August 27th, followed by 48 at Goodwin. There was a single day, August 27th, when the average ERC was 41.2, above the critical level of 40.

MORE WILDLAND FIRE FACTS: There were 25 fatalities due to vehicle accidents from 1990 to 1998. Volunteer firefighters accounted for 72 percent of the total deaths. A couple of reasons cited for this high percentage include unfamiliarity with the vehicle and infrequent opportunities to operate the vehicles.

Falling snags have resulted in one death since 1992.

There were 104 wildland firefighter fatalities in 2004. Volunteer firefighters accounted for 78 deaths. Heart attacks resulted in an additional 49 deaths. Three firefighters lost their lives in aircraft accidents. Firefighter deaths in 2004 occurred in 40 states. Pennsylvania had the highest number of fatalities (17).

On August 29th, 1985 a total of 73 firefighters were forced to seek cleared safety zones while battling the Butte Fire near Salmon, ID.

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STATISTICS FOR AREA TWO (COAST RANGE)

This area is comprised of zones 602 and 603. RAWs used to represent the area include:

South Fork, Miller, Rye Mountain, Rockhouse1, Wilkinson Ridge, Village Creek, High Point, Clay Creek, and Abernathy Mountain.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			4 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	60.1	45.6	69.2	0	98.4	0	2.5	20.9	9	5	3	2
11-20	59.9	46.1	63.9	0	89.4	0	0.1	25.7	7	5	3	4
21-31	68.2	47.8	45.9	3	75.2	2	4.3	16.3	3	1	0	2
June 1-10	60.0	43.9	62.3	0	90.2	0	2.4	20.6	6	3	2	1
11-20	67.2	47.7	53.0	0	94.8	1	6.0	16.6	6	3	1	4
21-30	71.9	53.2	60.6	0	96.4	0	11.6	15.6	2	0	0	1
July 1-10	74.6	55.1	57.3	0	96.0	0	17.7	14.2	3	1	0	0
11-20	80.1	55.9	43.9	0	86.8	3	23.9	14.2	1	0	0	0
21-31	84.5	55.6	33.3	2	76.9	4	38.9	9.6	1	0	0	2
Aug 1-10	83.7	55.7	33.4	2	78.7	4	48.5	8.8	0	0	0	0
11-20	82.8	55.0	37.8	1	85.5	2	47.9	10.8	0	0	0	0
21-31	78.8	52.3	38.8	1	86.0	2	46.6	11.6	1	0	0	1
Sept 1-10	74.1	50.7	43.1	0	86.0	1	42.6	12.4	2	0	0	1
11-20	68.9	47.5	48.4	0	93.8	0	34.9	15.3	1	0	0	0
21-30	70.7	48.3	40.9	0	81.3	4	39.8	12.4	1	1	1	0
Oct 1-10	58.0	45.4	75.9	0	97.4	0	12.5	22.8	8	4	2	2
11-20	60.1	46.8	74.0	0	97.3	0	12.6	20.1	4	2	1	0
AVE/TOT.	70.8	50.2	51.9	9	88.8	23	23.1	15.8	55	25	13	20
2004	71.5	50.6	54.9	8	93.4	14	17.9	16.3	45	29	16	20
2003	73.0	50.4	48.5	16	88.2	13	33.7	13.7	25	15	7	14
2002	71.9	48.7	48.8	6	90.3	22	29.2	13.9	34	17	7	5
2001	75.1	48.7	44.2	19	93.3	12	NA	NA	29	17	8	2
2000	73	51	55	7	90	12	NA	NA	33	11	4	4
1999	72	51	53	5	90	12	NA	NA	33	11	4	3
1998	76	53	54	0	92	6	NA	NA	22	6	3	2
1997	74	53	57	2	93	4	NA	NA	36	26	14	6

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<u>DRY SPELL</u>							
2005	2004	2003	2002	2001	2000	1999	1998
83 DAYS	53 DAYS	80 DAYS	78 DAYS	32 DAYS	57 DAYS	33 DAYS	83 DAYS

AREA HIGHLIGHTS

OVERVIEW: The Coast Range was slightly cooler and drier than 2004. The average maximum humidity of 88.8 percent was the second lowest since 1996. In 2003, the average was 88.2 percent. There were 23 “critical humidity nights” (defined below), the most since 2002. May through early July was rather wet. There were 13 days when the median precipitation was at least 0.25 inches, and 9 of them occurred from May 1 through June 20. The season’s dry spell of 83 days was the longest since 1998. The dry spell started on July 9th and ended on September 29th.

Fuel conditions during the 2005 season were slightly more extreme as compared to 2004. The 10-day average ERC exceeded the critical level of 45 throughout August, and then dipped slightly below in early September. The highest 10-day ERC average was 48.5, occurring August 1-10. During the 2004 season, the maximum 10-day ERC average was 44.0. The wet May and June resulted in single-digit ERC values through June 20th. Unlike 2004, ERC’s remained in the mid to upper 30s from mid-June through September 30th. Last year, ERC values dropped into the mid-teens in late August.

Lightning frequency for 2005 was the same as last year, with 20 days. Like the coastal strip, nearly all of the lightning days occurred in May and June. However, there were two lightning days in late July that coincided with the lowest 10-day average nighttime humidity, warmest 10-day average high temperature and near-critical fuel conditions.

TEMPERATURE: In the 2005 season, the average high of 70.8 degrees was the coolest seasonal average since at least 1994. May and October were quite cool and wet. The warmest 10-day period occurred at the end of July, with 84.5 degrees for an average. It remained rather warm through August. The last 10 days of August were the coolest, with an average of 78.8 degrees. Only one station exceeded 100 degrees during the season. Wilkinson RAWS, in zone 603, recorded three 100-degree days: July 27th at 102 degrees, August 14th at 101 degrees, and July 18th at 100 degrees. Village Creek RAWS recorded 98 degrees on July 27th. It is interesting to note that the 10-day average high was 70.7 for the period September 21-30, but then decreased to 58.0 October 1-10.

HUMIDITY: Critical daytime humidity during the 2005 season was defined as: at least five stations reporting 25 percent or less humidity, for at least two hours on any given day. There were nine critical daytime humidity days during the season, comparable to eight days in the 2004 season. Three of the nine critical humidity days happened in late May. Minimum humidity dropped into the 18-28 percent range at many sites during the period May 24-27. Abernathy recorded 18 percent on the 26th and 27th. The lowest daytime reading for the season was 12 percent at Clay Creek and High Point on August 14th.

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Critical humidity nights for the 2005 season were defined as greater than half of the stations reporting relative humidity less than or equal to 60 percent for at least two hours during any given overnight period. There were 23 critical humidity nights, which was almost twice as many as during the 2004 season. These were generally confined to July and August. There were three 10-day periods during the 2005 season when the average nighttime humidity was below 80 percent. This did not occur in 2004. On May 27th, humidity recovery at Abernathy, South Fork and Rockhouse was 30 percent or less. Of eight available stations that night, only two had humidity recovery above 60 percent (Village Creek and Clay Creek).

PRECIPITATION: The two main wet periods of the 2005 season were May through mid-June, and October. Generally, the peak fire season could be confined to mid-July through the end of September. In any given year, there are normally a couple of late-season (mid to late September through October) east wind events. These cases are common in October. This year was unusual because offshore flow never materialized. October was rather cool and wet. The season ended on September 30th, when over an inch of rain occurred throughout much of the area. Rye Mountain had 1.55 inches, South Fork 1.52 inches, and Abernathy 1.16 inches. On October 3rd Wilkinson RAWS picked up 1.47 inches of rain. The highest 24-hour rain amount at any station was 1.95 inches at Wilkinson RAWS on June 5th.

There were many more rain events this season with a median precipitation of .01 to .09 inches compared to 2004. In fact, the 55 days was the most since at least 1994. “Wetting rain” days, with a median 0.25 inches or more, were fewer than last year but still well above the past 10-year average.

FUELS: Low ERC values prevailed from May through mid-June 2005, increased abruptly in July, then continued to climb in August. Based solely on ERC values, the 2004 fire season peak period was July 11 through August 20. This year, the peak period was July 20 through September 30. The highest 10-day average ERC, the period August 1-10, was 48.5. Critical values of 45 or higher persisted throughout August. The highest daily average of the 2005 season was 55 on August 9th and August 15th. Last year, the highest daily average was just 44. Critical ERC values occurred on 31 days. Rockhouse RAWS observed the highest ERC during the season. On August 26th, the ERC at Rockhouse was 68. In fact, Rockhouse recorded 67-68 August 25th-27th.

The 10-day average 100-hr fuel moisture values dropped to 8.8 percent August 1-10. Single-digit 10-day averages occurred twice. Last year, the lowest 10-day average was 11.5 percent at the end of July. Village Creek and Rockhouse observed 100-hour fuel moisture values of 6 percent in early August.

INTERESTING TIDBITS: In 2004, the lowest 10-day average daytime humidity was 38.8 percent, July 21-31. In 2005, there were four consecutive 10-day periods when the average daytime humidity was less than 40 percent (July 21-August 31). Daytime humidity in September 2005 was much lower in 2004. Last year, the 10-day averages ranged from 55 percent to 73 percent. In 2005 the 10-day averages were in the 40s. In fact, this year there were four critical humidity nights in late September.

Crews on the Butte Fire (August 29, 1985) were forced to stay inside their fire shelters for one to two hours. It was determined that crews on the Butte Fire could not have survived without adequate safety zones.

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STATISTICS FOR AREA THREE (SOUTH WASHINGTON CASCADES, NORTH OREGON CASCADES, AND FOOTHILLS)

This area is comprised of zones 605, 607 and 660. RAWs used to represent the area include:

Log Creek, Red Box Bench, Horse Creek, Eagle Creek, Blue Ridge, Elk Rock, Trout Lake, Canyon Creek, Stayton, Hamilton, Locks, Dry Creek, and Wanderer's Peak.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			7 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	57.1	44.3	70.3	0	97.7	0	1.1	22.8	10	6	3	2
11-20	57.8	44.6	69.0	0	97.0	0	0.0	27.4	7	6	4	4
21-31	66.9	48.1	46.1	3	78.1	4	0.8	17.6	3	2	2	2
June 1-10	57.2	42.6	61.4	0	92.6	0	1.1	21.5	7	3	2	1
11-20	64.8	44.4	49.4	0	91.9	2	4.9	17.1	7	4	1	3
21-30	66.5	48.4	60.3	0	95.9	0	7.8	16.7	4	2	1	0
July 1-10	67.8	49.6	55.7	0	94.0	0	10.8	15.6	4	3	2	0
11-20	76.1	52.2	41.0	1	85.6	2	18.3	13.9	0	0	0	0
21-31	82.0	54.7	33.4	2	81.6	4	32.1	10.0	1	1	0	2
Aug 1-10	81.0	54.4	32.4	3	78.9	3	43.3	8.9	0	0	0	0
11-20	80.1	53.4	36.2	2	80.7	4	45.1	10.3	1	0	0	0
21-31	75.2	51.1	39.3	3	81.9	4	45.6	11.0	1	1	1	1
Sept 1-10	71.0	48.6	42.8	0	86.8	1	40.5	12.7	2	1	0	2
11-20	65.4	44.3	47.2	0	92.6	0	33.8	15.2	1	0	0	0
21-30	68.1	45.1	38.2	1	78.2	5	38.7	12.3	2	1	1	0
Oct 1-10	55.9	42.2	66.9	0	94.7	0	9.1	23.0	8	5	2	1
11-20	58.8	44.1	66.9	0	95.2	0	9.6	19.8	3	3	0	0
AVE/TOT.	67.8	47.8	50.4	15	88.4	29	20.2	16.2	61	38	19	18
2004	68.5	49.3	51.5	14	87.0	33	17.9	16.1	57	37	22	28
2003	70.1	48.7	46.9	27	84.7	25	32.2	13.5	33	23	13	15
2002	68.5	47.2	48.8	13	86.5	30	29.7	13.4	40	22	9	11
2001	66.1	46.9	55.7	4	89.0	23	NA	NA	42	23	25	7
2000	69	49	52	16	87	17	NA	NA	22	13	8	3
1999	68	48	52	15	82	22	NA	NA	36	18	7	10
1998	72	52	53	6	84	17	NA	NA	28	13	7	19
1997	69	51	61	1	89	13	NA	NA	37	27	17	11

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<u>DRY SPELL</u>							
2005	2004	2003	2002	2001	2000	1999	1998
37 DAYS	53 DAYS	77 DAYS	70 DAYS	32 DAYS	44 DAYS	30 DAYS	83 DAYS

AREA HIGHLIGHTS

OVERVIEW: Of significance for the South Washington Cascades and the North Oregon Cascades and Foothills were precipitation and lightning frequency, the fuel indices and the short dry spell. Overall, the 2005 season was nearly a carbon copy of 2004. Nearly all parameters were identical. The one major exception was lightning frequency. In the 2004 season, there were 28 lightning days, the most in any season since at least 1994. In 2005, there were 18 lightning days. Two-thirds of those days occurred in May and early June. The prime fire season was rather short, generally July 21st through September 11th. The “dry spell” was only 37 days (July 23 through August 28). Critical fuel indices developed in mid and late August. Fortunately, there was just one lightning day during that period. The average ERC value of 20.2 was slightly higher than in 2004, but well below the 2003 level of 32.2.

TEMPERATURE: The warmest 10-day period occurred in late July with an average of 82.0 degrees. The warm trend extended through most of August. September was seasonable, but dry. Last year the 10-day period September 11-20 had an average high temperature of just 57.2 degrees. The 2004 season all but ended in late August.

No station observed a 100-degree reading. The highest temperature was 98 degrees at Locks and Hamilton in late July. Despite the wet and cool May, the 10-day average high for May21-31 was 66.9 degrees, nearly nine degrees warmer than the previous 10-day average. On May 27th, highs were generally in the middle 80s to lower 90s. Locks reported 92 degrees, while Elk Rock and Stayton registered 90 degrees.

HUMIDITY: Critical daytime humidity was defined as at least seven stations recording 25 percent or less humidity for at least two hours on any given day. There were 15 critical daytime humidity days during the season, as compared to 14 in 2004. There were five 10-day periods when the average daytime humidity was less than 40 percent. The lowest 10-day average was 32.4 percent August 1-10. In 2004, there were only two such periods. The lowest reported humidity was 11 percent. Eagle Creek, Wanderer’s Peak, Trout Lake, and Locks observed 11 percent on four separate days. Critical humidity nights for the 2005 season were defined as at least seven stations recording 60 percent or lower humidity for two hours. The 29 critical humidity nights were concentrated in late July through August. However, there were five such nights in late September. In fact, the 10-day average of 78.2 percent during the period September 21-30 was the lowest of the season. On the 26th, several stations reported humidity recovery in the 30s and 40s. Horse Creek had 24 percent and Log Creek reported 31 percent. The low nighttime recoveries were primarily due to subsidence inversions.

PRECIPITATION: Wet conditions prevailed through early July. Of the 19 total days when median precipitation equaled or exceeded 0.25 inches, 15 days occurred in May through early July. On July 6th Hamilton RAWS recorded 0.95 inches. A slow-moving upper low continued to affect the South Washington and North Oregon Cascades/Foothills, and the Hamilton RAWS had 1.37 inches on the 8th, Elk Rock reported 1.20 inches and Canyon Creek had 0.97 inches. Tremendous rainfall amounts occurred on September 30th. Two to four inches were common. Hamilton RAWS recorded 5.34 inches. Log Creek observed 3.40 inches. Daily average ERC values went from 38 on September 29th, to 15 on the 30th.

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FUELS: Similar to the Coast and Coast Range, the South Washington and North Oregon Cascades/Foothills had low ERC values through the end of June. The 10-day average exceeded 10 in early July, and then peaked in the 40s in August and early September. Critical values of above 45 occurred from August 11 to August 31. The peak 10-day average was 45.6, August 21-31. In the 2004 season, ERC values dropped off dramatically in late August, and continued to decrease in September. This year, ERC values in early September were in the low 40s, fell off a bit in the middle part of the month, then spiked to near 40 by the end of September. However, a major rain event on September 30 and continued rainfall in early October brought ERC values under 10 by October 10th.

Daily average ERC values exceeded critical levels of 45 or higher on 22 days. The highest daily average was 54 on August 26th. In 2004, the highest daily average was 47. Despite the wet May and June, and continued rainfall into early July, the seasonal average ERC of 20.2 was slightly higher than the 2004 average of 17.9.

The 10-day average 100-hour fuel moisture values were as high as 27 in mid-May, and remained elevated into early July. By early August the 10-day average had fallen to 8.9. The 100-hour fuels remained near 10 through August, and then increased slowly in September.



FIGURE 5 – CLARK FIRE INFORMATION BOARD. WILLAMETTE N.F., AUG 2003.

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STATISTICS FOR AREA FOUR (CENTRAL CASCADES AND FOOTHILLS)

This area is comprised of zones 606 and 608. RAWs used to represent the area include:

Boulder Creek, Yellowstone, Hawley Butte, Trout Creek, Brush Creek, Pebble, Fields, and Emigrant. NOTE: Hawley Butte was re-located June 11th.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			4 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	56.2	42.8	71.0	0	98.1	0	1.5	22.9	10	8	6	2
11-20	58.3	43.5	65.1	0	97.8	0	0.1	27.5	8	6	3	3
21-31	68.0	45.9	44.3	3	82.8	4	1.8	16.1	5	3	1	2
June 1-10	58.8	40.2	59.1	0	97.2	0	0.1	23.9	7	4	4	1
11-20	64.1	43.7	52.3	0	97.6	0	1.1	18.0	7	3	1	5
21-30	70.9	48.0	51.6	0	96.3	0	6.8	15.9	3	1	0	0
July 1-10	72.3	49.8	50.7	0	94.9	0	14.6	13.8	4	1	0	0
11-20	82.3	53.5	36.1	2	88.4	2	22.4	13.5	0	0	0	0
21-31	85.3	55.2	27.7	2	77.0	5	38.9	8.7	0	0	0	2
Aug 1-10	85.4	55.2	26.2	3	74.3	5	50.5	7.9	0	0	0	0
11-20	83.8	53.5	26.9	4	75.3	4	56.3	8.2	0	0	0	0
21-31	79.0	50.5	31.4	4	78.5	4	54.4	9.6	1	1	0	2
Sept 1-10	72.0	48.0	41.6	0	88.6	1	45.6	12.4	2	2	1	1
11-20	68.6	43.6	41.8	0	91.7	0	32.7	15.8	2	1	0	0
21-30	70.6	44.5	33.7	2	80.6	3	39.1	11.8	1	1	1	0
Oct 1-10	59.1	41.5	58.6	0	95.3	0	16.0	21.0	6	3	1	1
11-20	63.3	45.0	57.0	0	93.1	1	21.2	17.5	2	2	0	0
AVE/TOT.	70.5	47.3	45.6	20	88.7	29	23.7	15.6	58	36	18	19
2004	71.8	49.0	45.6	19	86.5	30	23.3	14.8	43	26	20	24
2003	73.4	49.0	42.3	43	83.5	29	38.8	12.2	30	19	6	17
2002	72.4	47.4	40.7	29	84.6	43	37.5	12.2	30	14	9	13
2001	73.5	47.8	38.0	36	83.5	40	NA	NA	35	29	12	11
2000	75	50	42	21	85	13	NA	NA	19	12	6	7
1999	73	50	43	15	81	18	NA	NA	34	12	4	9
1998	76	53	48	5	85	14	NA	NA	19	7	5	18
1997	74	52	51	5	89	10	NA	NA	34	25	14	12

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<u>DRY SPELL</u>							
2005	2004	2003	2002	2001	2000	1999	1998
51 DAYS	73 DAYS	67 DAYS	51 DAYS	22 DAYS	57 DAYS	34 DAYS	83 DAYS

AREA HIGHLIGHTS

OVERVIEW: A glance at the data shows that the 2005 season was almost identical to 2004 for the Central Cascades and Foothills area. But, there were a couple of major differences. First, there were more days in 2005 when the median precipitation was one-tenth of an inch or less, and also when the median precipitation was one-tenth to one-quarter of an inch. Second, there were fewer lightning days. The average high temperature of 70.5 was the coolest since at least 1994. Despite the wet May and June, which contributed to extremely low ERC values, August fuel indices were actually higher than those in August of 2004. The peak 10-day average was 56.3, compared to 53.2 in 2004. The dry spell this season was 51 days, which is near the average of 53 for the previous nine years. The dry spell began July 9th and ended August 28th.

TEMPERATURE: The warmest 10-day period occurred in early August, with 85.4 degrees. The main difference between 2005 and 2004 occurred during October. In 2004, October average high temperatures were in the 70s. This year, the average highs were near 60. On October 1st and 2nd, highs in zone 608 were mainly in the mid 40s to lower 50s. As in the 2004 season, no station recorded a 100-degree temperature. The highest temperature was 97 at the Pebble RAWS on July 27th. In fact, July 27th was the warmest day throughout the area. Emigrant and Boulder registered highs of 96.

HUMIDITY: Critical daytime humidity in the 2005 season was defined as at least four stations recording 25 percent or less humidity for at least two hours, on any given day. There were 20 critical daytime humidity” days during the season, compared to 19 in 2003. The lowest reported humidity was nine percent at Pebble and Boulder on July 27th. Fields also reported nine percent on September 25th. Last year there was just one 10-day period when the daytime humidity was below 30 percent. This year, there were three periods. The 29 “critical humidity nights” (defined as at least four stations recording 60 percent or lower humidity for two hours) were concentrated from mid-July to the end of August. July 27th was the warmest day, but also the driest night. The humidity recovery at Emigrant was just 20 percent. Yellowstone reported 25 percent. The lowest 10-night average was 74.3 percent during the period August 1-10.

PRECIPITATION: The area experienced a wet May and June. There were 15 days in May and June 2005 when the median precipitation was at least 0.25 inches. This surprising statistic occurred during the 58 days when median precipitation ranged from 0.01 inches to 0.09 inches. The highest 24-hour amount was 1.82 inches June 5th at Yellowstone RAWS. Yellowstone had the top three 24-hour rainfall amounts this season. On September 9th 1.68 inches fell, and on September 30th 1.53 inches occurred.

FUELS: The 2005 ERC values were extremely low from early May through early July. Last year early May ERC values were around 10. This year ERC’s were near 0, and stayed there until mid-June. ERC’s peaked in mid-August and remained quite high through early September. The highest 10-day average, during the period August 11-20, was 56.3. Critical values of 50 or higher occurred on 33 days, compared to 20 during 2004. The highest daily average was 63.4 on August 28th, compared to 56.2 last year. The lowest 10-day 100-hr fuel moisture average was 7.9 in early August. The lowest daily average was 6.5 on August 15th. July 24th. A daily average of 7-8 was noted July 27th through August 16th.